



ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
Division of Water

**Big Lake Water Quality Sampling 2013  
Frequently Asked Questions**

November 2013

**Q1: Concerns have been raised that the method DEC is using to determine if the lake is meeting standards for hydrocarbons are “more stringent” than typically used or required. Applying the rules too stringently here could end up negatively impacting the use of this popular lake.**

**A1: a) How does the water quality criteria for Alaska compare to elsewhere?**

Alaska’s water quality criteria for petroleum hydrocarbons were established in 1979 and are more stringent than those of other states. These criteria are based on laboratory testing of Alaskan fish and shellfish to determine their response to petroleum hydrocarbons in water. These test results are confirmed by other scientific studies of the effect of petroleum spills and discharges in the natural environment. These tests and studies indicate that a four-day average exposure to more than 10 parts per billion of total aromatic hydrocarbons results in long term impacts such as reduced reproduction and smaller, less healthy fish.

**b) What method does DEC use to decide if the water quality is impaired?**

DEC has also developed a more stringent methodology than other states for determining that a waterbody is impaired by petroleum hydrocarbons. DEC requires a large amount of high quality data to make sure the impairment decision reflects a real hazard to healthy fish populations in the lake. DEC requires evidence that petroleum hydrocarbons are present over a four-day period with an average concentration that exceeds the water quality criteria. DEC requires this intensive level of information because petroleum is volatile and degrades quickly.

**Q2: Is it appropriate to sample right at the marina on high use days (like the Fourth of July and Memorial Day) when more human activity will result in higher concentrations of hydrocarbons than on “typical days?”**

**A2:** Yes, it is appropriate because the high use, four-day periods will expose fish and other organisms to petroleum levels that have been shown to reduce reproduction and impact growth of the fish. Even if other days have lower levels of petroleum, the fish will continue to be harmed from the exposure during that busy period when standards were exceeded. The impairment status indicates that fish are being harmed and it is important to keep working to fix the problem.

The purpose of the Summer 2013 sampling was to measure whether hydrocarbon concentrations have gone down in response to efforts in recent years to improve water quality in Big Lake – efforts like the Clean Harbors program, the “Keep Big Lake Clean” campaign, and the individual efforts of the residents and users of Big Lake.

**Q3: Is sampling in the high use marina areas likely to be representative of water quality in the rest of the lake?**

**A3:** No. The impaired water listing is for the East Basin of the lake during open water months, and not the West Basin, which is why monitoring is focused on the East Basin.

**Q4: Does water in the lake get flushed out regularly because of the inflow from Meadow Creek and the outflow from Fish Creek?**

A4: Yes, the lake has flow between Meadow Creek and Fish Creek, but the amount of flow is much less than a river and does not flush as well in some areas. DEC data indicates that hydrocarbon levels are persistent over a four-day weekend. This means that high levels of the hydrocarbons at the end of a day persist in the water overnight and are measured the next morning. In a river, petroleum levels drop more quickly during the night, but in a lake with a large volume of water like Big Lake, not enough flushing occurs to flush the pollutants from the lake quickly.

**Q5: Are there potential sources, other than the two-strokes and other watercraft, which may be possible contributors to the hydrocarbon concentrations in the lake? Are there possible sources along Lucille Creek and Meadow Creek?**

A5: No, other sources have been investigated and are not the cause of the aromatic hydrocarbon exceedances found in Big Lake. Previous water quality studies investigated possible other sources such as tanks or drums possibly leaking into Big Lake, Meadow Creek or Lucille Creek. DEC has also tested Meadow Creek for petroleum during the past two years and the creek water meets the petroleum standards. Lucille Creek empties into Meadow Creek so any contamination from that area would have shown up in the samples taken at the mouth of Meadow Creek. DEC also investigated the possibility that vehicle traffic on the ice during winter was contributing to the petroleum pollution. However, samples taken just after the ice melted did not find any petroleum over standards.

The aromatic hydrocarbons being measured in Big Lake are more associated with refined gasoline rather than fuel oil, so it is likely that the petroleum is from the motorized boats and personal use watercraft. Data on motorized watercraft presence at the time of sampling also shows a very strong correlation between the number of motorized watercraft and the concentration of aromatic hydrocarbons.

**Q6: Is Big Lake considered impaired according to Federal Water Quality Standards?**

A6: Yes. Big Lake is included on the U.S Environmental Protection Agency's (EPA) report to the U.S. Congress on the status of impaired waterbodies throughout the country. The EPA has also approved the water quality improvement plan for Big Lake in 2012, also called a Total Maximum Daily Load document.